2834
#6 Response
Shaeen
12/21/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Roy Bates et al.

Serial No.: 09/931,921 Group Art Unit: 2834

Filed: August 20, 2001 Examiner: Thanh Lam

For: ELECTRIC MOTOR MUFFLER

RESPONSE

Assistant Commissioner for Patents
Washington, D. C. 20231

Sir:

Applicant submits this Response to the Office Action dated September 23, 2002.

Response

The Examiner has rejected all of the pending claims of the present invention for various reasons. The Examiner has objected to the drawings and made a §112, second paragraph rejection. The Examiner has also rejected the claims pursuant to §102 in view of the Miller reference. Applicant will address each of these concerns of the Examiner, but only after a clear discussion of the invention and the prior art reference cited. Once the invention is better understood by the Examiner and the prior art reference is clarified, Applicant submits that the application should be allowed.

Turning first to the present application, the invention is a motor housing

that assembly having a unique muffler component. The construction of the muffler acts to increase the airflow efficiency through a motor housing, and it reduces noise caused by the fan of the motor adapted to fit into the housing. The muffler accomplishes its objectives conceptually by creating more laminar airflow out of the fan exhaust. The noise reduction aspect is accomplished, again conceptually, by turning the airflow (and noise) in the passageway between the fan exhaust and the exit (outlet port) from the housing.

We first discuss the creation of laminar flow by the muffler assembly. This is the invention claimed in claims 1-6, 9-11, 13 and 14 of the application. The laminar flow aspect of the muffler assembly is discussed in detail in the specification at pages 6 and 7 of the application and as shown in detail in Figures 3, 6 and 7. As can be seen, the present invention assumes the use of an axial fan, that is, the air is blown or forced downwardly as shown in Figure 3. The invention further envisions the placement of a cone in the immediate exhaust path of the fan. The top of the cone is mounted adjacent the fan (exhaust side) in order to create the laminar flow. Attached as an exhibit to this Response is a photocopy of Figure 3 illustrating the airflow arrow as well as the location of the fan blades 28 and the cone 50.

While it is potentially difficult to imagine, the fact is that pure fan exhaust from the conventional axial fan shown in the drawings creates turbulence that affects the efficiency of the fan. By placing the cone in the

immediate exhaust of the fan, however there is a reduction in turbulence which is evidenced by an increase in airflow through the fan. See, for instance the example on pages 9 and 10 of the application including specifically the Air Flow Rate table on page 10. As demonstrated in that table, in test one, a motor with an axial exhaust (that happens to have been the motor that was the model for the drawings in the application) had a certain flow rate. The flow rate with no muffler (no cone) was considerably less than the flow rate in test two when simply a cone was applied next to and adjacent the motor as shown in the drawings. The relative flow rates are substantially different (approximately 33 cf/m versus approximately 41 cf/m). So merely placing the cone in the immediate exhaust of the fan can substantially increase the efficiency and airflow of the fan. In fact, the placement of the cone next to the fan increases the efficiency so much that, as demonstrated in test 3 shown in the table, even when an exhaust passageway is added (with its inherent turbulence), the flow rate out of the fan is better than if there was no cone or exhaust passageway. The noted flow rate differences are substantial given the cooling and performance requirements of a fan and motor during operation.

While laminar airflow has inherent noise reduction benefits, Applicant has discovered that turning the airflow (and the sound in that airflow) has further noise reduction benefits. This is the discovery that is claimed in claims 7-14 of the present application. Specifically, if an air outlet passageway

includes turns totally at least 270°, then substantial noise reduction is achieved. This reduction is proven in the example as set forth in the Noise Mitigation table shown on page 11 of the application. As seen in that table, a fan with no muffler has substantially higher noise generation than a fan with the muffler (test 2) that includes the three, 90° turns of the passageway as illustrated in the drawings and described in the detailed description of the present application.

Now we turn to a further explanation of the three, 90° turns and at least 270° of direction change. At the outset, as will be demonstrated, this feature is clearly shown in the specification and drawings as they were submitted. Nevertheless, Applicant understands the Examiner's struggle with this concept, because it is such a novel innovation. First, a clear and definitive discussion of the specific turns in the outlet passageway is contained in the specification on pages 7-8 and in Figures 3 and 5B. Copies of Figures 3 and 5B are highlighted and attached to facilitate demonstration of th flow in a step by step manner. Figure 3 illustrates the first 90° turn where the vertical, downward airflow is turned into a horizontal flow. This is further noted on page 8, lines 3-4. Next, that airflow turns in a 180° fashion (two 90° turns) out the outlet passageway into the outlet port. This is demonstrated in Figure 5B as highlighted in the attached photocopy of 5B. This turn is noted on page 8, lines 4-5 of the detailed description. The total turns of the airflow as defined by the

passageways is therefore 270°. Obviously, other turns and combinations of turns are possible to similarly achieve this turning of the exhaust passageway by 270° or more.

As is evident from the foregoing, the Examiner's objections to the drawings and rejection of claims 7-14 pursuant to §112 are respectfully traversed. The drawings are clear and complete as provided. There is no correction required. The language of claims 7-14 is supported in the specification. Their meaning is clear and not indefinite.

Turning now to the Miller reference cited as the anticipatory reference, it will be seen that the Miller reference does not and physically can not contain all of the claimed limitations of the present invention. The errors in the citation to Miller as an anticipatory reference will be discussed in the claim groupings noted earlier (claims 1-6, 9-11, 13 and 14 and claims 7-14).

Turning first to the "cone" claims 1-6, 9-11, 13-14, it can be seen that the Miller reference incorporates and teaches a radial exhaust fan. This is shown in Figure 2 as well as at Col. 3, lines 29-36 of the patent. Because Miller has a radial exhaust fan, it is effectively impossible to have a cone mounted in an outlet passageway adjacent the fan. There may be other ways that engineers may discover to create a more laminar flow from a radial fan, but a cone in accordance with the claimed invention is a non-sequitur in the context of the radial fan in the Miller patent. Specifically, the wall 42 in Miller

is part of a diffuser passageway 41. By its own definition, the passageway promotes diffusion, another way of saying slowing down of the exhaust air. As noted in the present application at the bottom of page 8, air diffusion can reduce efficiency of airflow. In any event, since the physics of airflow from a radial fan (Miller) is so fundamentally different from the axial fan (present invention), then the claimed "cone" is not proper for use in connection with Miller wherein no comparable structure is or can be found.

Second, specifically with respect to claims 7-14, the Miller reference discloses an outlet passageway with no more than 180° of direction change. Attached is a highlighted version of Figure 2 of the Miller reference, the same figure cited by the Examiner. As can be seen, there are three turns in the exhaust passageway, but those turns total no more than 180°. The first two turns are approximately 45° each. The third and final turn is a 90° turn. These have been numbered and highlighted as turns I, II, and III. Accordingly, the airflow path in Miller discloses only approximately 180° in turns at most. This is not near the 270° cited and claimed by Applicant. Importantly, the airflow turns of Miller are consistent with the discussion and with the engineering of Miller. Miller teaches diffusion and foam materials to enhance its flow and sound damping characteristics.

Although the claimed invention is now distinctly clear from the Miller reference with respect to independent claims 1, 6 and 7 at least, Applicant

notes that the Examiner has made a rejection of the remaining dependent claims. Unfortunately, those rejections are made with only conclusory and vague references. Those rejections must be stated with more particularity in reference to the Miller patent. Applicant can not respond to the alleged rejections without specific references to Miller except to say that the dependent limitations are not believed to be found in Miller. Those rejections should be withdrawn for the fundamental reasons discussed earlier. They should further be withdrawn for the lack of any specific bases.

In summary, Applicant believes that the drawings are not objectionable. Corrected drawings are not required. Further, the limitation "a plurality of turns totaling at least 270° of direction change" is clearly defined and set forth in the specification. Finally, the rejection of the claims in view of Miller as an anticipatory reference is not correct. Applicant respectfully requests that the application is in condition for allowance. Favorable action is requested hereon.

The Commissioner is hereby authorized to charge any deficiencies in payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 50-2127.

Respectfully Submitted,

December 11, 2002
Date

John H. Thomas
Attorney/Agent for Applicant(s)
Reg. No. 33,460

John H. Thomas
John H. Thomas, P.C.
1561 East Main Street
Richmond, Virginia 23219
Tel. 804 344 8130

Attorney Docket: HAMBE 10

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the appropriate address at the U.S. Patent and Trademark Office required under 37 C.F.R. § 1.1(a) on December 11, 2002.
by:
John H. Thomas